

In the Drawings

Please sheets 1 and 2 of the original drawings with the attached Replacement Sheets 1 and 2, in which “prior art” designations have been added to FIGS. 1-3 of the drawings.

Remarks/Arguments

Claim Summary

By this Amendment, claims 1, 4, 7, 19 and 31 have been revised, non-elected claims 33-48 have been cancelled without prejudice or disclaimer of their subject matter, and new claims 49-51 have been added for the Examiner's consideration.

Accordingly, claims 1-32 and 49-51 are now pending in the application.

Drawings

As required by the Examiner, Replacement Sheets of drawings are attached in which FIGS. 1-3 have each been labeled a prior art.

Allowable Claims

Applicants acknowledge with thanks the indicated allowability of claims 4, 5, 7, 8, 19, 20, 31 and 32.

It is noted, however, that claim 7 (and thus 8) should have been dependent upon claim 6, rather than claim 4. By this Amendment, this error has been corrected.

Also, by this Amendment, claim 4 has been amended into independent form by incorporating the subject matter of original 1; claim 19 has been amended into independent form by incorporating the subject matter of original claims 15 and 16 (but not claims 17 and 18); and claim 31 has been amended into independent form by incorporating the subject matter of original claims 15 and 30.

It is thus believed that claims 4, 5, 19, 20, 31 and 32 are now in condition for allowance.

35 U.S.C. ¶102

Claims 1, 12-16, 29 and 30 were rejected under 35 U.S.C. ¶102 as being anticipated by Yanagida (US 6429096) for the reasons stated at pages 3-4 of the

Office Action. Applicants respectfully traverse this rejection with respect to the now-pending claims.

Claims 1 and 12-14

By this Amendment, independent claim 1 has been revised to recite that the conductive material which fills the through hole and “directly” contacts the first and second conductive pads of the semiconductor chip and printed circuit board, respectively. An example of this is illustrated in FIG. 4 of the present application, where the conductive material 50 directly contacts the chip pad 31 and the PCB pad 45.

As Applicants understand the rejection, the Examiner equates the mother board 25 of Yanagida to the presently claimed printed circuit board, and the metal plugs 23 of Yanagida to the presently claimed conductive material. However, the metal plugs 23 of Yanagida do not directly contact the lands 11 of the mother board 25. Rather, either solder balls 10 (FIG. 7) or solder bumps 12 (FIG. 8) are interposed between the mother board lands 11 and the metal plugs 23 of Yanagida.

For at least the reasons stated above, Applicants respectfully contend that claims 1 and 12-14 are not anticipated by Yanagida.

Claims 15-16, 29 and 30

It appears from the rejection that the Examiner has overlooked an aspect of structure recited in claim 15. That is, according to claim 15, each of the stacked chip package includes a semiconductor chip and a printed circuit board attached to a surface of the semiconductor chip. As such, the structure of claim 15 includes a plurality of printed circuit boards stacked within the respective chip packages.

As noted previously, the Examiner seems to equate the mother board 25 of Yanagida to the claimed printed circuit board of each chip package. However, Yanagida teaches the use of the mother board 25 to commonly support a stack of semiconductor chips 7. Yanagida does not teach stacking of chip packages where

each package includes a printed circuit board attached to a surface of a semiconductor chip.

For at least the reasons stated above, Applicants respectfully contend that claims 15-16 and 29-30 are not anticipated by Yanagida.

35 U.S.C. ¶103

Claims 2-3, 6, 9-11, 17-18 and 21-26 were rejected under 35 U.S.C. ¶103 as being obvious over Yanagida in view of Wu (US 6459150) or Saito (US 6735857) or Hayasaka et al. (US 6809421) for the reasons stated at pages 3-4 of the Office Action.

However, Applicants respectfully contend that the Wu, Saito et al. and Hayasaka et al. reference would not motivate one of ordinary skill to obviate the deficiencies of Yanagida et al. as discussed above in connection with the rejection under 35 U.S.C. ¶102.

Accordingly, Applicants respectfully traverse this rejection 35 U.S.C. ¶103 for the same reasons as discussed above in connection with the rejection under 35 U.S.C. ¶102.

New Claims 49-51

New claims 49-51 contain subject matter corresponding to original claims 6-8, respectively. In other words, these claims do not include the aforementioned amendment to claim 1.

Original claim 6 would be rejected under 35 U.S.C. ¶103 as being obvious over Yanagida in view of Wu (US 6459150) or Saito (US 6735857) or Hayasaka et al. (US 6809421) for the reasons stated at pages 3-4 of the Office Action. Applicants respectfully traverse this rejection with respect to new claim 49.

The Examiner points to the teachings of Wu and/or Hayasaka et al. to argue that it would be obvious to align apertures in the PCB 25 of Yanagida. Applicants disagree. Wu and Hayasaka et al. are both directed to semiconductor packages in which apertures are formed through support substrates (e.g., 88 of Wu) or the like

to allow for stacking of the packages one atop the other. In contrast, the PCB 25 of Yanagida is a mother board (col. 8, line 62) which itself supports a stack of PCB packages. As is notoriously well known in the art, a mother board contains a number of edge mounted terminals for mounting into a computer device or similar. It would not be obvious to form apertures in the mother board 25 of Yanagida as suggested by the Examiner.

Further, one of ordinary skill would not modify the mother board 25 of Yanagida to include an electrode which is electrically connected to a second conductive pad and which protrudes through the aperture in the printed circuit board as recited in claim 50, nor would one of ordinary skill include an solder ball which is electrically connected to a second conductive pad and which protrudes through the aperture in the printed circuit board as recited in claim 51 .

For at least these reasons, Applicants respectfully contend that new claims 49-51 define over the prior art.


Conclusion

No other issues remaining, reconsideration and favorable action upon the claims 1-32 and 49-51 now pending in the application are requested.

Respectfully submitted,

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